

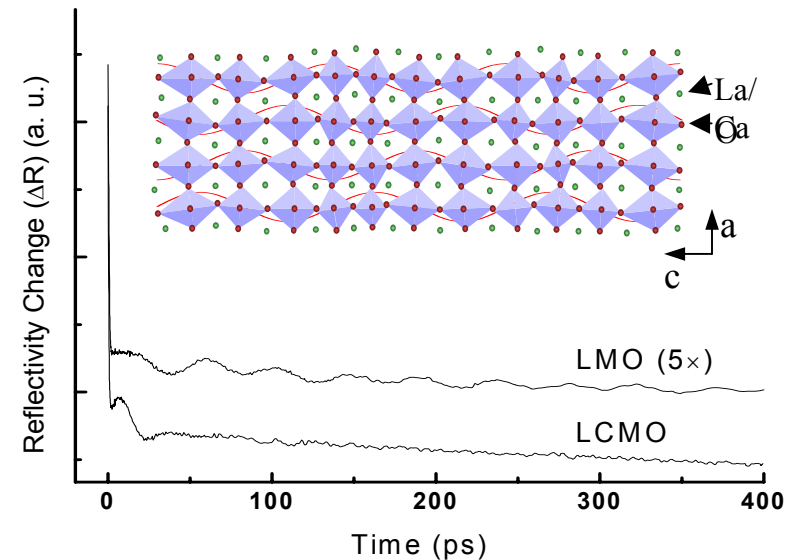
Femtosecond Studies of Coupled Electron-Lattice Dynamics in Doped Perovskite Manganites I

Gunter Luepke, College of William & Mary, DMR-0137322

The manganese oxides have recently rekindled strong interests as exceptional candidates for magnetic sensors and detectors because of the colossal magneto-resistance (CMR) effect observed at room temperature.

Thin films with large magnetoresistance at room temperature open up new possibilities for applications in diverse areas of technology such as magnetic random access memories and read heads for hard disk drives.

The goal of this research program is to elucidate the unusual magneto-transport properties of doped manganese oxides by studying the coupled dynamics of the charge carriers and that of the lattice deformations which surround them.



Coherent oscillations in the transient reflectivity from LCMO thin film and LMO single crystal. The inset depicts a schematic illustration of optically excited collective modes. The charge/orbital ordering fluctuations cause complex rotations of the MnO₆ octahedra.

Femtosecond Studies of Coupled Electron-Lattice Dynamics in Doped Perovskite Manganites II

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Educational: 2 grad students,

A materials science course was developed and taught to graduate students at the College of William and Mary.

The course emphasizes the physical and chemical origins of the properties of solids while at the same time focusing on the technologically important materials that are being developed and used by scientists and engineers.

Recent and continuing advances in the design and manipulation of materials atom by atom to create artificial structures are revolutionary steps in the development of materials for specific applications.

It is hoped that the course will serve to focus the attention of new students toward the goals of developing and perfecting new materials and new applications for existing materials.



Magneto-electronics and optics group at the College of William and Mary.